

DOCUMENT RESUME

ED 180 226

FL 010 835

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 TITLE Capturing Temporal Structures. CUNYForum, No. 5-6.
 INSTITUTION City Univ. of New York, N.Y. Graduate School and Univ. Center. Program in Linguistics.
 PUB DATE 79
 NOTE 10p.: Paper presented at the annual meeting of the North East Linguistic Society (9th, New York, NY, November 10-12, 1978)
 EDRS PRICE MF01/PC01 Plus Postage.
 DESCRIPTORS *Connected Discourse: *Discourse Analysis: Language Research: *Semantics: *Sentences: Syntax: *Time Perspective: Verbs
 IDENTIFIERS *Textual Organization: *Time Expressions

ABSTRACT

This paper is directed toward a traditional problem in the analysis of texts, that of finding meaningful linguistic units that are larger than a sentence and smaller than the text itself. Two principles are given for finding extended temporal structures based on the temporal expressions that occur in sentences: a sentence can be captured to form part of an extended temporal structure, just in case it does not have a deictic adverbial; and a sentence can be captured only if it has the same tense as its captor. Problematic cases are discussed and judged not to present insuperable difficulties for the principles. However, based on temporal expressions only, the principles do not explain the way extended temporal reference actually works in texts. It is concluded that, in general, textual constructions cannot be accounted for with principles that are sentence-based and syntactically oriented.
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CAPTURING TEMPORAL STRUCTURES

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This paper is directed toward a traditional problem in the analysis of texts, that of finding meaningful linguistic units that are larger than a sentence and smaller than the text itself. I will focus here on temporal reference. One type of unit that suggests itself is temporal: sentences that share temporal reference might constitute a unit, and in analyzing a text one might locate such units according to the temporal expressions in individual sentences. Temporal reference often extends over several sentences or considerable chunks of a text, of course, so that what I am proposing involves no more than organizing very familiar material in a particular way. I will refer to cases of temporal reference that have a domain of more than one sentence as "extended temporal structures."

In the first section I will outline an approach to extended temporal structures based on the temporal expressions that occur in sentences, and give two principles for finding such structures. I discuss in section two a group of problematic cases, and argue that they do not present insuperable difficulties for the principles proposed. However, I will show in the third section of the paper that the approach represented by these principles is fatally limited. Based on temporal expressions only, they do not explain the way extended temporal reference actually works in texts. I suggest that the limitations of this approach indicate a very general fact about texts: they cannot be accounted for with principles that are sentence-based and syntactically oriented.

The examples given here are short sequences of sentences, for the most part. I am interested in interpretations of these sequences in which the sentences are related to each other. I assume a sort of Gricean co-operative approach such that, when sentences are presented together, one expects and can always find a connection between them. An example that illustrates the power of this expectation is the following, suggested by Hobbs (1976).

- 1 (a) I was sick last week. (b) The chicken soup wasn't very good.

To interpret this sequence one assumes a connection between the speaker's illness and chicken soup, in our culture not a very far-fetched connection. And indeed almost any sequence can be interpreted by assuming a connection of some sort, for instance:

- 2 (a) The moon is made of green cheese. (b) Let's go to the movies.

One interpretation of sequence 2 is that, whenever the speaker feels that the moon is made of green cheese, going to the movies is in order.¹ No doubt there are other plausible interpretations. In what follows I will be concerned with plausible interpretations of sequences as connected, and will ignore other possibilities.

1. Extended temporal structures

Temporal reference in English is indicated by the combination of tense and time adverbial; I assume that sentences have one time adverbial each, of unlimited complexity. [These statements are based on my analysis of temporal reference, presented in Smith 1978, and are justified in that paper.] Certain combinations of tense and time adverbial establish time reference and others do not. When a combination fails to establish time reference, the sentence in question is dependent on information in another sentence for full temporal interpretation. Sentences with tense only are vague: they are unspecified for time reference, and are also dependent on information in other sentences or on extra-linguistic clues.² I shall say that extended temporal structures consist of sentences that depend on each other for temporal information. Such sentences may be dependent or independent in other contexts, but function together in a given text as an interdependent temporal unit.

The sequences in 3-5 are extended temporal structures. The b sentences are dependent for essential temporal information on the a sentences.

3 (a) I saw Mary last night. (b) She was happy.

4 (a) I talked to Mary on Friday. (b) She was leaving in 3 days.

5 (a) Mary arrived at noon. (b) John came later.

3b has no time adverbial, while 4b and 5b have time adverbials that do not establish temporal reference. 3b is taken to have the same time reference as 3a: it is understood that Mary was happy last night. In the sequences 4 and 5, a time established in the a sentence allows full interpretation of the b sentence. For instance, we understand 4 to mean that Mary planned to leave 3 days from Friday.

The relationship between the a and b sentences above -considering only temporal interpretation- can be described with a military metaphor: the a sentences can be said to have "captured" the b sentences, since in the extended temporal structures the latter are dependent on the former for full interpretation.

Continuing with the military metaphor, extended temporal structures can be considered from the point of view of captor or captive. In this discussion I will focus on possible captives, assuming that possible captors have combinations of tense and time adverbials that establish time reference. As possible captives, sentences may be grouped into three classes: a sentence may be available for capture, it may require capture, it may be protected from capture. I discuss the three types, in the order mentioned.

Available for capture. Sentences with tense only are available for capture, as shown above with 4b. There are also sentences of another type that can be captured, and these are more interesting because they establish time reference when they occur in isolation or in certain contexts. In the appropriate sequence they are part of an extended temporal structure. 6 and 7 exemplify:

6 (a) Every Sunday afternoon Paul took the bus to town.

(b) He (Paul) went to the movies at 5.

7 (a) Next Sunday we are flying to Oslo.

(b) We visit friends on Monday.

Consider 6b: it indicates that Paul did something at a certain time - in the simplest interpretation, at 5 o'clock prior to Speech Time (ST). This is the simplest interpretation in the sense that it requires no information other than that given in the sentence. (See Smith 1977 for discussion.) In sequence with 6a, however, the sentence has quite a different interpretation: it specifies an habitual activity of Paul's on Sunday afternoons. In terms of capture, the frequency adverbial of 6a has captured 6b: the sequence 6 is an extended temporal structure with an habitual interpretation.

Similarly, the interpretation of 7b is different, in the sequence 7, from the interpretation it would have alone. The simplest interpretation of 7b alone is that we plan, on the Monday following ST, to visit friends. In sequence 7, however, 7b indicates the Monday after next Sunday.

Both 6b and 7b have time adverbials that are understood alone in terms of ST: they anchor to ST, although ST need not be given explicitly. In sequences like these, however, the adverbials anchor not to ST but to a time established in another sentence. To interpret a time adverbial it is essential to know how it anchors, and this property will provide a key to the capturing possibilities of sentences with adverbials.

Requiring capture. In the next examples, the b sentences require capture for temporal interpretation.

8 (a) Isobel went riding at noon. (b) Sylvia rode later.

9 (a) I talked to Michael at noon. (b) He was leaving in 3 hours.

8b can't be fully interpreted alone: Sylvia rode later than some time, but we don't what. 9b is not fully interpretable either, since it tells us that Paul planned to leave after some time -but not what time. Both of these sentences are interpretable in the sequences given, because the a sentences provide an anchor for the adverbials. The time adverbials in the b sentences do not anchor automatically to ST, then; they require an explicit anchor in another sentence. The adverbials of the b sentences are dependent in different ways, however. That of 8b is intrinsically dependent when it occurs alone;³ that of 9b is dependent in combination with the past tense only.

Sentences that require capture have dependent time adverbials. Such time adverbials require an explicit anchor in discourse: they depend on times given in other sentences.

Protected from capture. There are some sentences that are protected from capture. Consider for instance sequences 10 and 11:

10 (a) Robert talked to Bonnie at noon.

(b) He (Robert) arrived 3 hours ago.

11 (a) Every summer Paul travels.

(b) He (Paul) is leaving for Greece tomorrow.

Although these sequences are not incoherent, they cannot be taken as extended temporal structures. In isolation 10b indicates that Robert's time of arrival was 3 hours before ST; it has the same interpretation in sequence with 10a. The same situation obtains with 11, in that the interpretation of 11b is just what it would be if not in sequence with 11a.

The same type of time adverbial appears in the b sentence of both sequences: tomorrow and 3 hours ago are Deictic, and anchor inflexibly to ST. The examples show that Deictics protect a sentence from capture. The reason is that they do not re-anchor to a time other than ST, as do for example the adverbials of sentences that are available for capture.

Temporal adverbials can be classified according to how they anchor, and whether they can re-anchor. These are essential factors for interpretation. There are three main classes of adverbs according to these criteria: Deictics, that anchor inflexibly to ST without explicit statement of ST; Dependents, that anchor to a time given explicitly in another sentence; Flexible Anchoring, that anchor either to ST or to a time given in another sentence. 12 has a partial list of each type of adverbial.

12 Types of Temporal Adverbial

Deictic

tomorrow, yesterday, in - , - ago, next - , now, etc.

Dependent

earlier, previously, afterwards, etc.

Flexible Anchoring

at noon, before lunch, after John arrives, etc.

These categories are discussed in Smith, in press. Here they will serve to organize the facts about participation in extended temporal structures: sentences with Flexible Anchoring adverbials are available for capture, sentences with Dependent adverbials require capture for complete interpretation, and sentences with Deictic adverbials are protected from capture.

I can now state a generalization about temporal expressions in single sentences and in extended temporal structures. The generalization depends on the classification of adverbials according to their anchoring properties. A sentence can be captured to form part of an extended temporal structure, just in case it does not have a Deictic adverbial. One can think of this as a principle that would allow the establishing of extended temporal structures for texts by consideration of the temporal expressions that appear in single sentences.

A second principle is also necessary. The second principle involves tense, the other element needed for establishing temporal reference: A sentence can be captured only if it has the same tense as its captor. Sequence 13 illustrates - the two sentences have different tenses, and the sequence cannot be interpreted as an extended temporal structure.

- 13 (a) Last summer Isobel went to Greece.
(b) She will visit some friends.

The principle involving Deictic adverbials has a certain logic, and one would expect it to hold for languages other than English. If a language has adverbials that anchor automatically only to ST, those adverbials would not be available for capture in extended temporal structures. (Actually the situation is a little more complicated; see section 2.) The second principle, that participants in an extended temporal structure must have the same tense,

probably part of English only, and one would not expect it to be true of language generally. The tenses of English are notoriously asymmetric; and, of course, not all languages indicate temporal reference with tense.

2.

I turn now to some sentences that appear to cause difficulty for the principle barring deictic adverbials from extended temporal structures. I consider first sentences whose main verbs involve communication or consciousness, such as say, announce, realize, think, fear. In sentences with verbs like these, a deictic adverb can have an anchor other than ST; and such sentences can form part of extended temporal structures. Direct quotation, for instance, presents structures of this type:

- 14 (a) The ambassador's secretary announced last week:
(b) "The ambassador will resign in a month."

The deictic in a month is taken as anchored to the time established in the preceding sentence, last week.

Indirect discourse also allows deictics with anchors other than ST, and indirect discourse can also extend over more than one sentence, for instance:

- 15 John told me at noon that Mary had arrived an hour ago
16 (a) John told me (the news) at noon.
(b) Mary had arrived an hour ago.

Both examples have an interpretation in which Mary arrived an hour before noon, because the deictic can be taken as anchored to ST or to noon. Two points about these examples require brief comment: the particular deictics and auxiliary have. As I have noted elsewhere, deictic adverbials differ as to whether they allow re-anchoring of this type. Some deictics are very flexible, others are less so, and a few are rigidly anchored to ST. The most flexible deictics are in - and - ago, and the least flexible are tomorrow and yesterday. There is considerable variation among speakers on this point. Speakers vary, too, as to whether auxiliary have is obligatory if one time is anterior to another. For dialects in which have is obligatory for anteriority the re-anchored interpretation is preferred in examples like 15 and 16b.

One way to deal with these examples would be in terms of their main verbs. The main verbs, indicating communication and/or consciousness, have several special properties and could be marked in some way. They would be dealt with separately, and the principles of section 1 would still apply in general. However, this approach cannot be taken because of examples like 17:

- 17 (a) We invited Tom to join us for dinner, but he couldn't come.
(b) He was leaving in 5 minute.

In this sequence, b presents the reason Tom gave for being unable to come, but not as indirect speech. What is said is presented more directly, in a mode known variously as the "style indirecte libre," "erlebte Rede," "reported speech," "narrated monologue." I will use the last term here. The mode of narrated monologue presents thought and speech unrefracted through the consciousness of a speaker; it is neither direct nor indirect speech, lacking the directness of the one and the ambiguity of the other.⁴ In English this mode characteristically has an unusual pattern of deictics: pronouns are 3rd

person as in indirect speech, place and time adverbials are as in direct speech, tense is past." The following examples illustrate these points:

18

Direct	Report	Narrated
(a) I am ready now	She is ready now	She was ready now
(b) I will leave next Tuesday	She will leave next Tuesday S	She would leave next Tuesday

For discussions of narrated monologue, see the references in note 4.

Although narrated monologue often lacks indicators such as verbs of communication and consciousness, the characteristic pattern of deictics would make it easy to identify; and it could be treated as exceptional for the principle of deixis and extended temporal structure. However, neither indirect discourse nor narrated monologue need be treated as exceptions. They actually exemplify sentences with dependent adverbials, and as such do not require special treatment. When deictic adverbials appear in indirect discourse and narrated monologue, they do so in combination with the past tense and they constitute dependent adverbials in the sense of section 1. Thus, 17b can be interpreted only with temporal information from 17a; the narrated examples in 18 cannot be fully interpreted because they lack an anchoring sentence that gives an explicit time of reference. In terms of the discussion of section 1, such sentences require capture. They must occur as part of an extended temporal structure to allow full interpretation.

When deictic adverbials re-anchor as part of extended temporal structures they occur in dependent combinations of tense and adverbial (except in direct quotation). Therefore they do not constitute exceptions to the principle given above. Direct quotation remains as an exception.

I would like to note that deictics re-anchor only in expressions of communication and consciousness, whether or not there is an explicit verb that indicates this function. Compare, for instance, the interpretation of the deictic a week ago in 19 and 20:

19 On Sunday Mary told me she had lost the watch a week ago.

20 On Sunday Mary lost the watch she had bought a week ago.

In 19 the deictic can be interpreted as anchored to the time of the main sentence. But in 20, where it is not associated directly with a verb of communication or consciousness, this reading is difficult to get.

3.

I have argued that expressions of communication and consciousness do not pose insuperable difficulties for forming and recognizing extended temporal structures. But there is another, much more serious problem that arises when one tries to apply the principles formulated here to texts. The principles apply to temporal expressions in sentences, and they tell us when extended temporal structures are possible. However they do not, and cannot, tell us when such structures actually occur.

The reason for this fatal limitation is simply that semantic considerations are also relevant to extended temporal structures. These considera-

tions may not be accessible or even expressible in a syntactically oriented, sentence-based analysis. I would like to give some examples in order to illustrate the range of phenomena involved.

The first example involves temporal expressions. Note that in the sequence 21, b cannot plausibly be captured by a.

- 21 (a) Every weekday morning Jenkins did the same thing.
(b) Last year he (Jenkins) went to Idaho.

The units "every morning" and "year" are not commensurate, and therefore the former cannot capture the latter. Otherwise a and b could form part of an extended temporal structure and, in fact, if they were in opposite order capture could take place. This sequence shows that semantic details of temporal expressions are relevant to capturing.

The next example shows that other aspects of sentences besides the temporal are also relevant: it thus opens up a Pandora's box of possible considerations:

- 22 (a) Last week Nick went to Oxford. (b) He saw Danforth on Thursday.
23 (a) Last week Nick went to Oxford. (b) I saw Danforth on Thursday.

A plausible interpretation of 22 is that the sentences form an extended temporal structure: that "Thursday" refers to Thursday of last week, and that Danforth is someone whom Nick saw when he was in Oxford. 23 however has a somewhat different interpretation (this is hardly surprising since the subjects of 22b and 23b are different). I think a plausible interpretation of 23b is that "Thursday" is deictic, indicating a day in relation to ST. (Perhaps Danforth is someone who has news of Nick's activities.) These examples make it clear that other information besides the temporal is needed for the establishing of extended temporal structures. I think it is clear that this information is semantic. The point about a sequence like 22 is that the subjects of a and b must be coreferential, not that they be linguistic expressions that are related in some way.

Another type of information that affects the establishing of extended temporal structures is the relation of individual sentences to ST. Consider for example the interpretation of 24 uttered in July and the same sequence uttered in February.

- 24 (a) Jenkins is visiting the Taylors next summer.
(b) He (Jenkins) goes to London in September.

Now, if ST is July then "in September" may be taken as anchored either to ST or to "next summer," the time given in the preceding sentence. But if ST is February then there is an interpretation in which 24b is captured by 24a, and Jenkins' going to London will follow his visit to the Taylors. (There may be some differences of interpretation here, due to differing understandings of "next.")

One more example will suffice, I think, to make my point. Not only is the reference of subjects and other NPs relevant to extended temporal structure; also to be considered are verbs and the NPs related to them. Such relatedness can be decisive for establishing extended temporal structure. For

example, consider the following sequences, which differ in the 3rd sentence only.

- 25 (a) The Taylors went on a trip. (b) They sold their porcelain dog collection to raise the money. (c) The sale was last month.
- 26 (a) The Taylors went on a trip. (b) They sold their porcelain dog collection to raise the money. (c) The trip was last month.

Looking for extended temporal structures, we find (intuitively) that in 25, b and c form such a structure and that in 26, a and c form such a structure. The difference is indicated lexically: "sale" and "sold" indicate the relation between 25b and 25c, and similarly "trip" and "trip" indicate the relation between 26a and 26c.

The immediate conclusion to be drawn from these examples is that information other than the temporal is needed to establish extended temporal structure. But there is a more general conclusion, which bears on the whole question of whether there are linguistic structures beyond the sentence. I think it is clear that conditions which are based on linguistic expressions in individual sentences cannot in principle suffice to establish structures beyond the sentence. On the other hand their role should not be underestimated. Perhaps principles such as those sketched in section 1 can be said to establish conditions that are necessary, but not sufficient.

Notes

1. I am indebted to Lauri Karttunen for the suggestion of this particular connection between 2a and 2b.

2. See Smith 1977 for discussion of vagueness. I shall confine myself here to sentences that have complete temporal interpretation.

3. "Later" and some other adverbials function as dependents when they occur alone, but can also occur with an embedded sentence, e.g. "Bill left later than Tom did." In such sentences they are not dependents.

4. Lips (1927) makes the point that indirect discourse is intrinsically ambiguous. Banfield (1973), Cohn (1947), and Friedman (1955), as well as Lips, discuss indirect discourse and narrated monologue.

5. Habituals appear to be an exception to this statement, as for instance in the following: "Whenever we ask Tom to join us for dinner, he has an excuse. He is leaving in 5 minutes. He ..."

6. I believe that sentences like 20 may sometimes occur in fiction, giving the impression that the narrator is inside the consciousness of the character because of the use of deictics associated with consciousness.

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